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| EXAMINER | | | | |
| SHEVIN, MARK L | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/564,061

Applicant(s)

SAKAMOTO ET AL.

Examiner

Mark L. Shevin

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
4a) Of the above claim(s) 1-7 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 8-21 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/CDC)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Status of Claims

1. Claims 8-21, filed September 26th, 2008, are currently under examination. Compared to the claims filed January 10th 2006 in the preliminary amendment and examined in the previous Office Action mailed June 13th, 2008

Amended: Claims 1, 3-5, and 8-13

Withdrawn: Claims 1-7

New: Claim 21

Declaration under 37 CFR 1.132

2. The declaration under 37 CFR 1.132 filed September 26th, 2008 is insufficient to overcome the rejection of claims 8-20 based upon JP '068, JP 647, JP '497, and JP '184 as set forth in the previous Office Action because the declaration only files Tables 1,2, 3, and 4 that were missing from the specification and does not assert novelty or nonobviousness of the previous rejections.

Claim Rejections - 35 USC § 103

3. **Claims 8-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '068** (JP 63-140068) in view of **JP '647** (JP 2002-167647), **JP '497** (JP 2002-194497) and **JP '184** (JP 2003-027184).

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

JP '068

JP '068, drawn to producing high-cleanliness spring steel products with excellent fatigue characteristics by reducing the inclusions in the steel, teaches a spring steel with the following alloy and inclusion oxides compositions (all wt% unless noted, Abstract):

| Element or Compound | JP '068 | Instant Application | Overlap |
|--------------------------------|------------|---------------------|------------|
| C | 0.5-0.8 | 0-1.2 | 0.5-0.8 |
| Si | 1-4 | 0.1-4 | 1-4 |
| Mn | 0.5-1.5 | 0.1-2 | 0.5-1.5 |
| Al | 0.0001-0.5 | 0-0.1 | 0.0001-0.1 |
| Mg | 0.1-20 ppm | 0.1-15 ppm | 0.1-15 ppm |
| Ca | 0.1-20 ppm | 0.1-40 ppm | 0.1-20 ppm |
| CaO | 0-50 | 15-55 | 15-50 |
| SiO ₂ | 25-75 | 20-70 | 25-70 |
| Al ₂ O ₃ | 0-35 | 0-35 | 0-35 |
| MgO | 0-40 | 0-20 | 0-20 |

JP '068 teaches that these compositions in a steel product produce low melting point oxide inclusions that are reduced in sectional area during hot rolling and produces a steel with good resistance to permanent set along with excellent fatigue strength (Abstract).

JP '068 does not teach the presence of lithium or limiting inclusions to less than 20 μm using a 50 gram sample.

JP '647, drawn to providing a Si-killed steel with a minimum number of large inclusions that has excellent fatigue strength, teaches that inclusions can be made ductile by including an alkaline metal such as Na, K, or Li in the form of R_2O (para 0012). When this alkaline oxide is added to a SiO_2 system, the surface energy of the inclusions are reduced and fatigue strength of the steel is thus increased (para 0013).

JP '647 hit on the idea that an added alkaline oxide will be advantageous in making SiO_2 inclusions distributed as minute particles (para 0025). The alkaline oxide should be present in the inclusion between 0.5 and 10 wt% (Abstract).

JP '497

JP '497, drawn to providing a Si-killed steel by refining with a slag including an alkaline metal oxide such as Li_2O (Abstract), teaches that the amount of oxide inclusion and the total oxygen content can be reduced by controlling the slag composition (para 0011). Decrease in the total oxygen content decreases wide inclusions and an improvement in fatigue characteristics and processability are expectable (para 0022).

Alkaline metal oxides such as Na_2O , K_2O , or Li_2O show strong basic nature and reduce the activity of SiO_2 when mixed together as a slag (para 0014), in effect working to refine the slag itself. These alkaline metal oxides are added in the form of carbonates (para 0037 and 0054).

JP '184

JP '184, drawn to providing a high-strength steel wire rod having excellent cold wire drawability by minimizing inclusions, teaches that this is accomplished by having

less than 1 inclusion with a diameter greater than 20 μm per 50 g of the wire rod (Abstract).

As hard inclusions such as alumina comes from the refractories used in the manufacturing process, evaluation of their content by simple cross-sectional analysis (number per area) is not sufficient; instead inclusions should be more accurately measured by number per volume or weight of material (para 0004).

The acid dissolution, X-ray microanalyser (EPMA) method where the number of inclusions are measured per 50 grams of material was introduced by JP 09-12500 A (para 0005).

Regarding claims 8 and 21, it would have been obvious to one of ordinary skill in ferrous metallurgy, at the time the invention was made, taking the disclosures of JP '068, JP '647, JP '497, and JP '184 as a whole, to incorporate the Li_2O content in the inclusion of JP '647 and inclusion size restriction and measurement method of JP '184 into JP '068 for the following reasons. JP '068 had disclosed a high-cleanliness steel for use in springs with excellent fatigue strength by controlling the oxide composition of the inclusions to render them less harmful after hot rolling while JP '647 further taught that by providing 0.5 - 10 wt% of an alkaline oxide such as Li_2O to the inclusion, the surface energy is decreased and the fatigue strength is further increased above prior art levels.

While JP '647 does not specifically provide the end Li concentration in the steel in ppm, one would reasonable expect a concentration overlapping the claimed range as the inclusion Li_2O content is in the range claimed in dependent claims 10 and 13.

JP '184 teaches that inclusions should more accurately characterized by the presence per unit weight of the steel, in particular 50 grams of the steel in question and that cold drawability (ductility) is increased by having less than 1 particle with a diameter of greater than 20 μm per 50 grams of material.

JP '497 serves to reinforce the relationship between the lithium content in the slag (and consequently in the inclusion) as controlling slag basicity to reduce the activity of SiO_2 and thus improve fatigue characteristics.

With respect to the amendment to claim 8 (and 21 as a dependent claim by extension) narrowing the range of Li, while JP '647 does not specifically provide the end Li concentration in the steel in ppm, one would reasonable expect a concentration overlapping the claimed range as the inclusion Li_2O content is in the range claimed in dependent claims 10 and 13. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 9 and 11, the Li/Si and $\text{Li}_2\text{O}/\text{SiO}_2$ ratios represent a reflection of the original slag basicity in that these are analogous to the widely known CaO/SiO_2 ratios (JP '497) used in slag chemistry. JP '647 taught that the basicity of SiO_2 must be controlled to form ductile inclusions and this is done through the addition of an alkaline

metal oxide such as Li_2O (para 0012). Again in para 0057, the slag basicity must be controlled. Thus the prior art demonstrates slag basicity (and consequently the final Li / Si ratio) as a result effective variable and one of ordinary skill would be motivated to choose the instantly claimed ranges through process optimization as the prior art taught the basicity as the ductility of inclusions may be controlled as such.

Regarding claims 10, 12, and 13, as shown in the table above, JP '068 teaches CaO , SiO_2 , Al_2O_3 , and MgO contents that overlap the instantly claimed ranges and JP '647 taught Li_2O in the claimed range. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 14 and 15, as shown in the table above, JP '068 teaches C, Si, Mn, Al, Mg, and Ca contents that overlap the instantly claimed ranges while JP '647 and JP '497 teach that the oxygen content should be below 15 ppm (0.0015%). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case

where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists."

Regarding claims 16-20, JP '068 teaches a high-cleanliness steel composition with Cr, V, Nb, and Ti contents and with a balance of Fe as the composition is a steel and of course unavoidable impurities as are germane to refined steel.

Response to Applicant's Arguments:

4. Applicant's arguments filed September 26th, 2008 have been fully considered but they are not persuasive.

Applicants assert (p. 9, para 1-3) that the cited prior art does not, expressly or inherently, suggest the limitation of the total Li-content between 0.020 and 9 ppm by mass and the 0.020 to 6 ppm by mass limitations of new claim 21.

From MPEP 2112: [T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on 'inherency' under 35 U.S.C. 102, on '*prima facie* obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same. The technical reasoning used to assert that the prior art has the claimed Li content is the a function of the lithium content bound in the inclusions. The amount of inclusions can be determined by one of ordinary skill in the art based on analysis of the prior art processing methods. Thus while JP '647 does not specifically provide the end Li concentration in the steel in ppm, one would reasonable expect a concentration overlapping the claimed range as the inclusion Li_2O content is in the range claimed in dependent claims 10 and 13.

Applicants assert (p. 9, final para) that any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant reduction in density of oxide inclusion particles of 20 microns or above.

In response, Applicants appear to be asserting unexpected results however , from MPEP 716.02: "any differences between the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicants have not met the burden of unexpected results nor criticality of the claimed range. The evidence relied upon should establish "that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance." *Ex parte Gelles*, 22 USPQ2d 1318, 1319 (Bd. Pat. App. & Inter. 1992). Evidence of unexpected properties may be in the form of a direct or indirect comparison of the claimed invention with the closest prior art which is commensurate in scope with the claims. See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In Fig. 1 there is no comparison of the closest prior art to establish an unexpected superiority in harmful inclusion content.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

-- Claims 8-21 are finally rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

January 12th, 2009
10-564,061